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USEFUL RECEIPTS.

Solder for Iron.

We publish the following by request; it was published before in volume 5, but it will be new, we have no doubt, to some thousands of our present subscribers. The receipt is not a new one, but a good old one, *none the worse for a little wear.*

When the filings of soft cast-iron are melted in a crucible with borax, which has been previously calcined in order to get rid of the water it contains, a hard shining, black pitch-like soldering substance is obtained, being glass of borax colored black with iron.

Sal ammoniac having been applied to the internal joining, or between the overlapped edges of thin sheet iron, some of this black solder being powdered is to be laid along a short portion of the joint, and as soon as it is melted over a clear forge fire, the soldered part is to be placed on the beak of an anvil and beaten with a light hammer and quick hand, as long as the heat permits. More of the powder is then to be laid upon the adjoining part of the joining, until the whole of the seam is soldered.

Another method, which has been published for this purpose, is to melt five ounces of borax in an earthen crucible, and when melted, to add half an ounce of sal ammoniac, and pour the melted matter upon an iron plate. When cold, it will appear like glass, and is to be powdered and mixed with an equal quantity of unslaked lime.

The iron or steel being heated to a red heat, a little of the above powder is to be sprinkled on the surface, where it will melt like sealing wax. The iron or steel is then to be again heated, but considerably below the ordinary welding heat, then brought to the anvil, and hammered until the sufaces are perfectly united.

Feeding Bees.

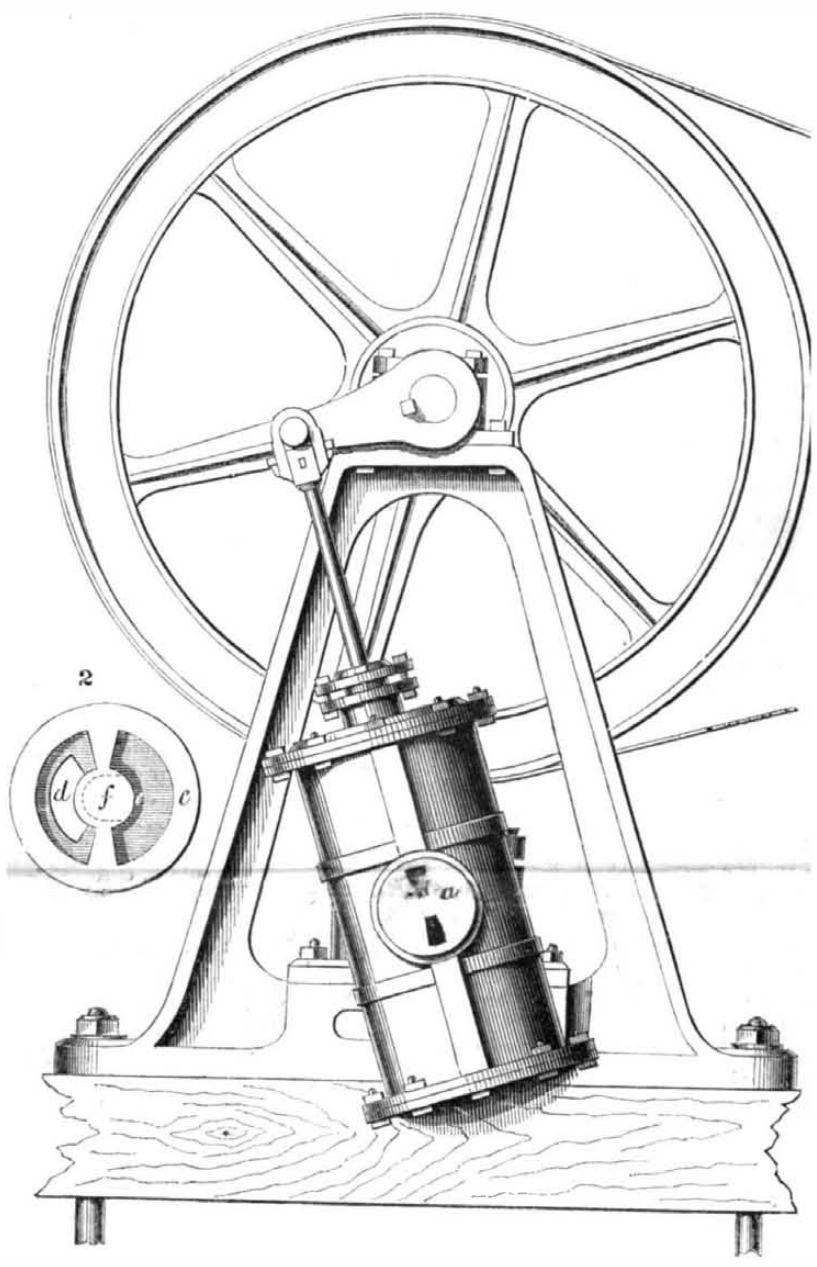
"Put a pound of brown sugar in a low tin dish, wet it with water, and lay a number of small strips of wood across for the bees to rest on while at work. One pound of six-cent sugar produces two pounds of honey."

Our neighbor of the Scientific American must revise his chemistry. How a pound of food can become two pounds of secretion, besides supporting the animals, it is beyond our reach to discover. We have seen the same statement before and commented on it in our last number.—[The Plow, Loom, and Anvil.

[Our neighbor must revise *his* chemistry. How can a stalk of corn produce more weight of fruit than the guano applied to manure it? The question is not how much honey is produced from a pound of food, but a pound of sugar. Does not honey contain more moisture than sugar. Let our neighbor put 20 pounds of honey in a sugar evaporating pan and expel all the moisture, and then weigh the product and see if he gets any more than 10 pounds of a gummy sugar.

Benjamin Loder, Esq., the well-known head of the Erie Railroad Company, has resigned his trust into the hands of the Board of Directors, owing to continued weak health.

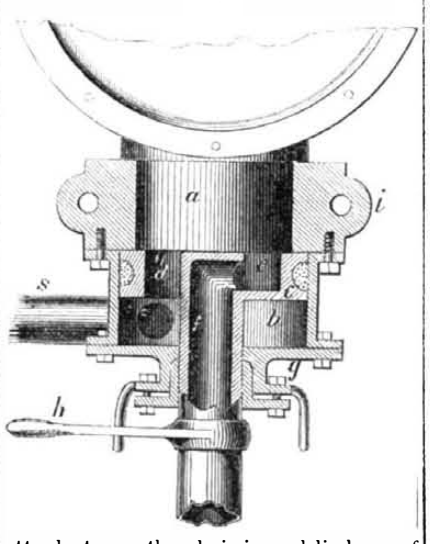
IMPROVED VALVE AND OSCILLATING ENGINE---Fig 1.



The annexed engravings represent an improvement in the valves of oscillating engines, invented and patented by Wm. M. Smith, of Washington, D. C. Oscillating engines possess the advantage of occupying but little space, are generally light, compared with others, and simple in construction.

One objection which they have heretofore been found to present, has been the difficulty

Fig. 3.



attendant upon the admission and discharge of the steam, and another difficulty has been the friction occasioned by the steam trunnions upon which the engine oscillates, being too tightly bound in order to prevent the escape of steam. This occasions unequal wear in the trunnions and stuffing box of the piston rod, and also detracts from the power of the engine. The object of the invention is to remedy these defects.

Figure 1 is a side view of the engine with a face view of the steam trunnion. Fig. 2 is an inside or face view of the valve, and fig. 3 is a horizontal section of the valves and steam chest as connected with the trunnion of the engine. The trunnion, *a*, of the cylinder is made as large on the face or end as convenient to admit of long radial passages being made through it; *b* is a short cylindrical steam chest, which is turned on the interior and firmly bolted to the lower half of the plummer block, *i*, forming a cover or cap to the end of the trunnion; in this steam-chest, *b*, is a piston valve, *c*, the face of which is ground, and fits against the end of the trunnion; this valve is fitted with metallic or other packing on its periphery, where it touches the sides of the cylindrical steam chest, and is stationary, thereby dispensing with all valve gear. The steam alternately enters and exhausts to and from either side of the engine piston by the oscillating motion of the trunnion, *a*, which is made with suitable steam ways in it. The action is as follows:—The steam enters through the opening, *d*, of the valve and the exhaust escapes through the concave, *e*, to the pipe, *f*, which passes through a stuffing-box in the centre of the steam-chest cover, *g*.

To reverse the engine, the valve is turned half round by the lever, *h*, fast on the exhaust pipe, *f*; steam is admitted to the cylindrical chest, *b*, by a pipe, S, and presses upon the back of the valve to keep it tigh. The advantages of this form of valve will be apparent by an examination of its simple structure and mode of operation.

For further information concerning rights &c., apply to the inventor.

Singular Swamp.

At Capetown, near Dundas, C. W., while the navies on the Great Western Railroad were digging through a swamp, they came across a stream of quicksand so fine as to have no grit to it. The stream is of a pale lilac. As this substance runs out from below, the top of the ground falls in. The track they had laid for drawing the dirt cars on has in many places fallen in, leaving the end of the rails sticking out in some places, while in others they have been swallowed up in toto. It is a curiosity to behold the springs at the source of this singular fluid. It boils up like a pot over a fire, depositing the heavier particles around the mouth of the crater, until it assumes the shape of a mound, the top of which is flat and in boiling motion.

Vermont Gold.

Rev. Zadock Thomson has written a letter giving an account of his experience in searching for gold in the vicinity of Bridgewater, Vt. He says:—

"The gold is found in the range of talcose slate and steatite, which is known to extend through the found engt of the State, from north to south. This range passes through Bridgewater, near the middle, and the gold locality is but a short distance from the centre of the township, towards the southwest. The gold is disseminated very sparingly in veins or seams of quartz, and is associated with the sulphurets of lead, iron and copper. The strata of slate between which the quartz is interspersed dip some 55 degrees towards the east, and the seams of quartz vary much in thickness, and are somewhat irregular—Gold has yet been found in only a few of these seams, and most of which has been obtained was from a single seam, in which several hands are now at work. This is from ten to twenty inches wide, and some portions of it are filled very abundantly with galena, or sulphuret of lead. At a blast made in this seam while I was present, more than one hundred pounds of pure galena were thrown out with the quartz, together with some sulphuret of iron, and a very few small particles of gold; but whether gold or lead will here be found in sufficient quantities to pay for working is yet problametical."

Greenwood Cemetery.

This populous city of the dead is now arrayed in its summer attire, and its cool shades attract a large number of visitors. On an average, 18 interments take place there daily; and passing the gateway from morning till night, is nearly an unbroken line of funeral processions. During a small portion of the year, the daily number of interments reaches 25 or 30. Since the 1st of January last, the interments number 2,760. The total number of interments since its first organization to the present time, is 26,470, of which 22,712 were made previous to the opening of the present year. The first interment took place in September, 1840.

Some very fine monuments are now erected in it, and we presume that no other single burial place in the world gives employment to so many persons. This city of the dead overlooks New York Bay, and the grounds are very beautiful.

A railroad festival was had at Savannah, Geo., on the 2nd inst. It was a grand affair

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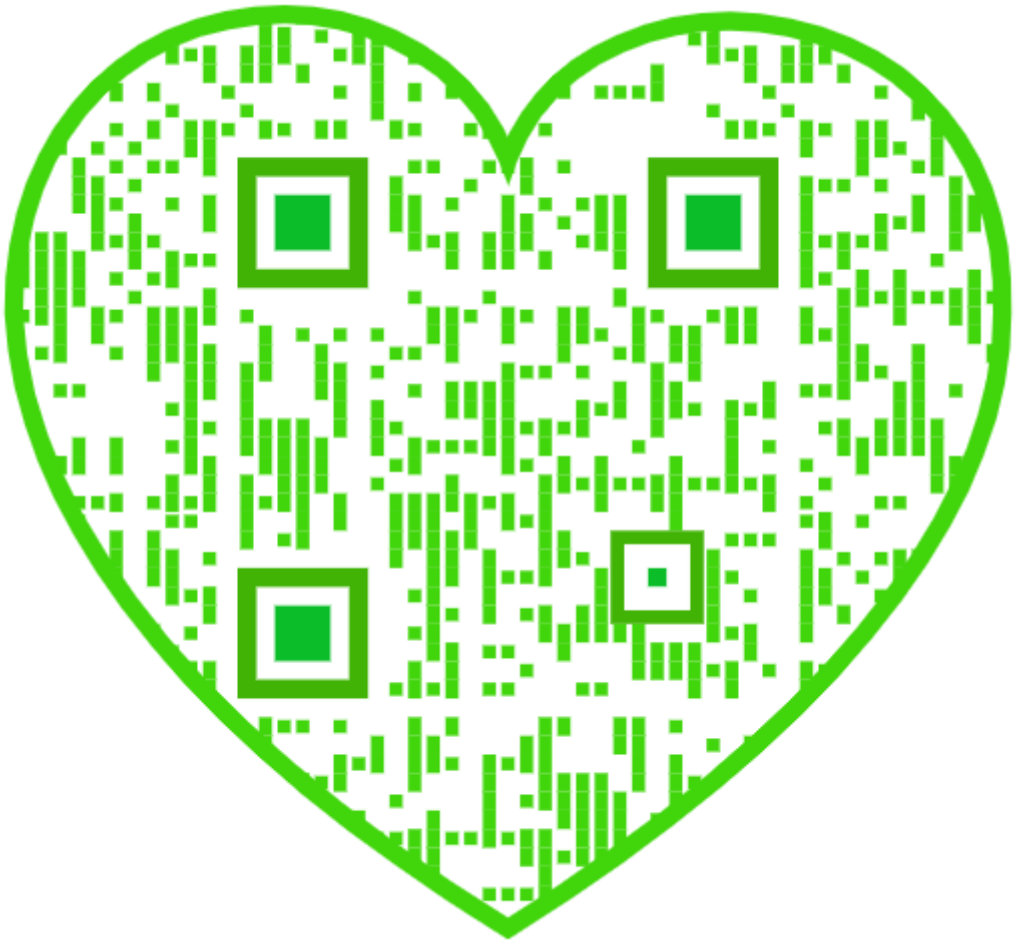

MISCELLANEOUS.

The North Pacific Expedition.

The expedition which has sailed from our country to visit Japan and various other countries, is one of much interest to men of science. True, in these expeditions some particular sciences have received much greater attention. The single department of zoology has, in some cases, been placed in charge of a corps of six or more savans, while other sciences have been entirely neglected. In the present only two or three of the scientific corps could be detailed for that department; but, on the other hand, important subjects of research, before but slightly considered or left untouched, have here received their due proportion of attention.

Mr. Storer, of Boston, accompanies the expedition as a chemist and has a fine apparatus. Mr. Kern, a photographer, also belongs to the corps scientific, and has good apparatus and an abundance of materials, and Commander Ringgold himself will act as chief astronomer and general superintendant. As assistant astronomers he has appointed Lieut. J. M. Brooke, and also Mr. Coolidge, of Harvard Observatory at Cambridge, whose studies both here and at the principal Observatories in Germany, well fit him for the position. In this department also most of the sea officers of the squadron will assist, especially in the minor operations. The intruments provided are numerous and of a superior character.

The science of geography is, of course, the great subject of investigation. In this Commander Ringgold has determined that the observations shall be complete. Economic considerations must of course have the primary position; the adaptation of the waters of the country to the purposes of navigation, whether for the commercial or whaling interest; its fisheries; its internal resources; vegetable productions, wood, mineral wealth, coal or metals. The accurate survey of all the coasts and islands lying within the scope of observation will also be a primary object. The topographical and hydrographical parties for this purpose will be formed from the sea officers of the squadron, who have been judiciously selected by Commander Ringgold for their proficiency in these departments. Most prominent among these stands Lieut. Commanding Rodgers, of the steamer John Hancock, whose experience on the coast survey, well fits him for this department. Landscape views, pictures of individuals of native tribes, &c., will be taken. There are corps for ornithology, geology, and zoology, in short, every department of science is represented on that squadron, and we have no doubt but the returns will be a rich harvest of important new information to our country, and the expedition will no doubt prove an honor to it.

Rheumatism.

As this disease is very common, and is a very painful one, any useful information on the subject may be of benefit to some of our readers. The following is part of an article on the subject from the "Dollar Newspaper," Philadelphia:—

"Rheumatism is a disease of the blood, and in order to effectually remove the disease, the rheumatic poison, (perhaps the urate of soda) must be eliminated from the circulation.—The principal depurating organs are the emunctories of the kidneys, the lungs, and the skin. Through the skin and the kidneys alone can the rheumatic poison be removed, and far more through the latter than the former. Every man afflicted with rheumatism should have a long bath tub, in which he can completely immerse his whole body. In such a tub (made of tin perhaps) he should every morning take a warm, weak, ley bath, rubbing the surface briskly with a flesh-brush till it glows finely. This bath should be used for four or five days, and then, for a few days, a strong salt-water bath (warm) should be substituted. This is the best external treatment known to the profession, and the great trouble is that it is so little known to them. Warm flannel should, of course, be constantly worn by rheumatics.

But the great remedy for rheumatism, after all, is diuretics; and among the best of them is the meadow saffron (colchicum autumnale.) The tincture of colchicum seeds is generally used. The brandy tincture is the best for decidedly nervous rheumatics; the wine tincture for those of a firm nerve fibre. Of either of these tinctures, 25 drops three times a day, for an adult, till it operates as a slight laxative (when the dose should be lessened) is about the right quantity. After using the tincture of colchicum for ten or twelve days, the solution of iodide of potassium (of the strength of one ounce to the pint of rain-water,) half a teaspoonful twice a day will speedily complete the cure. An experience of several years in the treatment of all grades of rheumatism has established the correctness of the above treatment. I have never seen a case that would not yield to its powers.—Sometimes acids or alkalies (according as the urinary deposit is white or red,) may be used with fine effect. The best acid that can be used in rheumatism is the citric, and the best form is that of sour lemonade.

The "Lynchburg (Va.) Express" says:—A gentleman wishes us to publish the followlowing for the relief of humanity. He says he has known a number of cures made by it, and all of them in a short time:—Half an ounce of pulverized saltpetre, put in half a pint of sweet oil; bathe the parts affected, and a sound cure will speedily be effected.

[We would state that the first extract is decidedly orthodox, and the information should be extensively circulated. The wine of colchicum affects a cure upon some persons subject to gout in a very short period. We cannot say anything respecting the practical effects of the latter receipt, but it is so simple that it can easily be tried, and that without risk.

Railway Apothegms.

Construction.—Make your road to last for years, and not for days.

Let your cuttings and embankments be guarded against falls of the one and slides of the other.

Let your curves be of large radius, and do not regard expense in having them so.

Avoid drawbridges utterly, if you can, and if they must be used let the approaches be open and clear for 1,500 feet on each side of them.

Build your *permanent* bridges in a thorough manner, and, whether of stone, wood, or iron, guard them effectually against the ordinary causes of decay—and thus, *partially* avoid massacres!

Use *compound rails* in preference to simple ones.

Increase the number of your "cross ties,' and the item of repairs will be decreased.

If you cross the rails of other roads, do so above or below them, and never on a level.

Let ordinary road-crossings be equally above or below your rails, and your conscience—if you have any—will be clearer.

Operation.—Provide a numerous and efficient police and you will be less criminal and have fewer damages to pay!

Establish careful, clear, and stringent regulations, and see that they are enforced, by punishing, remorselessly, their violation.

Let those regulations, and all signals, be unmistakable; and, if possible, uniform throughout the country, and the country will be the gainer as well as yourselves.

Police your road and "moving stock" every day, at least, and so lessen the chances of accident.

Be sure the men you employ are temperate, sensible, and active, and pay such liberally.

Avoid cheap directors, cheaper presidents, and careless switchmen.

Railroads were contrived for high velocities, and (if you mind these maxims) such velocities are the best; in other words, care will prevent accidents.

Money is plenty—so let foresight and policy guide your "rail" operations, and your dividends will be larger. Leyland.

Stevens & Kingsley's Sewing Machine.

Notwithstanding the great variety of sewing machines now patented and in use, new forms and improvements are constantly being added. The novelties of the machine above referred to, relate to the shuttle motion, the feed motion, the method of holding the cloth or material to be sewed in contact with the feeding device, and the means of producing a proper tension on the thread. The improvements make the machine a very convenient article for sewing boot legs and other articles of similar form, as the channel through which the shuttle slides, is within a long cylindrical tube around which the leg of the boot or other similar article, may be bent in the operation of sewing. Engravings would be necessary to render the construction of the parts to which the improvements relate, well understood. The inventors, M. W. Stevens and E. G. Kingsley, of Stoughton, Mass., have taken measures to secure a patent.

The Steam Yacht North Star.

The following is an original extract taken from the proof sheets of the next number of the "Knickerbocker Magazine," by Mr. Curtis, respecting the rise and progress of Cornelius Vanderbilt, Esq., the proprietor of the "North Star:"—

Until the age of sixteen, Mr. Vanderbilt was brought up on a small farm on Staten Island, owned and cultivated by his father. Arrived at this age, however, he found himself with a growing desire to make his livelihood by following the sea. He therefore left the farm, and commenced running a small sail boat between Staten Island and New York, which was owned by his father. After the age of nineteeen he commenced life on his own account, following the same business for the space of two years.

This brought him to the beginning of 1817, when his business life began with an activity and increased with an energy seldom equalled and more rarely surpassed. He now took charge of a small steamer running between New York and Elizabethtown, N. J., belonging to Thomas Gibbons. In 1818 he attended to the building of the steamer 'Bellona,' and was her captain for five years. In 1820, he built the steamer 'Caroline," which, it will be remembered, in the troubles on the Canadian borders, in the commencement of the 'Patriot' movement, was cut out at night at Schlosser, on the Niagara river, and sent, wrapt in flames, over the Great Cataract. This was the first steamer which Captain Vanderbilt built on his own account.

In 1821, he built the 'Fanny;' in 1822, the 'Thistle' and the 'Emerald;' in 1824 the 'Swan;' in 1826, the 'Citizen;' in 1827-8, the 'Cinderalla,' the 'Clifton,' the 'Union,' the 'Champion,' the 'Nimrod,' the 'Livingston,' the 'Cleopatra,' the 'Sound Champion,' the 'North Carolina,' the 'Governor Dudley,' the Vanderbilt,' the 'Gladiator.' These last four steamers he built for a company, for the purpose of running between Washington and Charleston, forming the regular mail line.

Then Captain Vanderbilt built the 'Sylph,' the 'Augusta,' the 'Emerald,' the 'Red Jacket,' the 'Hugenot,' the 'Hannah Burt,' and the 'Eastern,'—all fine boats—the 'C. Vanderbilt' and 'Commodore,' which formed the great Boston line by the way of Stonington and the Railroad. Captain Vanderbilt next built eight steamers for the Transportation Company, and the five steamers (?) that ran between Havana and Mantanzas. He also purchased, refitted, and ran the 'New Haven,' the 'Huntress,' the 'Water-Witch,' and the 'Worcester.' His next 'American productions' in this kind were the steamships 'Prometheus,' the 'Daniel Webster,' the 'Star of the West,' the 'Northern Light,' and the 'North Star.'

Nor are the vessels here enumerated all that have been built by Capt. Vanderbilt; there are several others whose names we cannot now recall.

Now we should like to have this hasty sketch of a poor American farmer's boy's early career and after advancement—this patent lesson of what industry, energy, enterprize, and integrity, can accomplish in a country of free institutions and free American republicans—we should be glad to have it seen and felt in the various quarters of Europe where the steamer North Star shall unfurl the flag of our country.

Mr. Vanderbilt has been, as we have seen, entirely the architect of his own fortunes. Amassing immense wealth, he has, at the same time, made the fortunes of thousands of others. He is now a large proprietor of manufacturing and engine building establishments. He probably gives employment to more hands than any other one man in America.

Events of the Week.

Atmospheric Telegraph.—We have received a communication from a correspondent who points out some difficulties in the way of the successful operation of an atmospheric telegraph. The first objection is, "1st. a perfect vacuum cannot be formed in the tube; 2nd. The tubes must be accurately bored out and fitted perfectly straight; 3rd. The piston must be packed, causing great friction, impossibility of oiling, and hence the packing must heat."

We have said before, that the difficulties in the way of its successful operation, are mechanical. If these can be overcome, there is no reason why it should not operate. We are well aware of the impossibility of forming a perfect vacuum with the best air pumps; and so are those connected with the Boston Atmospheric Telegraph. It is not positively necessary that the tube should be perfectly bored throughout; the packing of the piston obviates the necessity of having a *perfect* tube. We could not raise an objection against the plan by saying "the piston will heat," and we are positive that our correspondent has no correct information on this point. There are difficulties in the way of a successful atmospheric telegraph; if there were none, the system would have been in operation long ago. The question is, does Mr. Richardson's plan remove them? This question, on a small scale has been settled, and it will soon be, we have been informed, on a large scale.

A Bright idea about Heat.—"Suppose all the obstacles to the perfect and economical transfer of heat removed, so that *all* the heat in a cylinder full of steam could be transferred from the exhaust to the contents of the steam pipe—transferred from the outgoing to the in-coming medium, what would be the total mechanical effect of a unit of heat."

The above we have quoted from a scientific cotemporary, who calls for some one to answer his query. We refer him for an answer to the gentleman who made the discovery that 1 lb. of coal can be made to pump the Niagara river dry in a day.

Instead of progress having been made in physical science, we sometimes think, from the stuff uttered by pretenders to scientific knowledge, that there never was such a dearth of the genuine article. The above quoted paragraph simply means, "what would be the mechanical effect of a unit of heat in a steam engine, by exhausting into the boiler." The absurdity of the question shows the depth of the interrogator.

A Simple Fire Annihilator.—We perceive that a cotemporary speaks of sulphur as being an effective and simple fire annihilator, and tells of an insurance agent of Troy, N. Y., who recommends it as having been efficacious in one case, of saving *his* property. It is not a little remarkable that many discoveries are continually being developed some years after they have been described in our columns, and this is one among a number of others. If any person will turn over to page 2, Vol. 7, Scientific American, he will see in some comments upon the once celebrated Phillips' Fire Annihilator, that we distinctly mentioned sulphur as having been successfully used for extinguishing fires in chimneys.

Improved Mode of Casting Pumps.

An improvement in pumps, by John H. McGowen, of Cincinnati, Ohio, to which this invention forms a necessary appendage, has already been noticed in the Scientific American. Mr. McGowen has a mode of casting his pump, which renders it a much better article than those cast by the old process, and also renders the operation of casting much easier. In this operation the cores which form the interior chamber of the pump, are moulded upon the top of what is called the "knowl" or "drag," in such a manner that they will adhere thereto, and thus keep all the cores in their proper vertical position while the metal is poured. By this arrangement pumps o this description may be cast on either green or dry sand with equal facility. The inventor, Mr. McG., has taken measures to secure a patent.

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(For the Scientific American.)

Railways, Steamships, and Telegraphs.

RAILWAYS—I have seen on page 291, this volume of the Scientific American, that there are some hopes of improvement on our railways which will make them less destructive of life and property. Permit me to recall a proposition made in the very beginning of the system by Mr. Morgan, an able but too modest a man for the times we live in; this engineer was one of the first employed in Massachusetts and New York. He proposed to have timber between the two rails, about eighteen inches high, against which horizontal wheels should run freely, touching occasionally; the car wheels were to be without flanches, thus saving much friction; such wheels might be used on the present tracks. Perhaps more has been written on this subject than I have seen; I merely call it up for re-examination, if it has not been absolutely exploded. Corporations must do something for their own interest, and they will look to your valuable paper as the focus of mechanical intelligence; it would be well therefore, at this time, that speculation—good, bad, or indifferent, should bring forward their notions; a fool's hint may be made useful by a wise man.

SEA STEAMERS—I have seen also in your valuable paper, that a monstrous large steamer is about to be built in England, with four side wheels and a screw propeller. Here I beg leave to remind you that I had the honor to propose in your paper some time ago to construct all our long steamers with four wheels, and referred to the advantage of wagons over carts by way of illustration. The four wheels to a steamer will have some advantages over the wagon, for this will perform Fulton's desideratum, they will raise the vessel out of the water—that resting medium which offers more resistance exactly in proportion to the increase of speed; which proposition was thrown in the teeth of Fulton by the French philosophers when he told them that he could make a ship exceed fourteen knots an hour.

TELEGRAPHS AND STEAMERS—It will be long before we get a telegraph across the Atlantic; but a combination of the two systems will extend your telegraph as far East as possible, through Nova Scotia or Labrador, then cross from Newfoundland, or Labrador to Ireland by a steamer of iron expressly built for the postal service, and so strong, as to fear no storms or waves, very long compared with her width and depth, and with as much power as can be put into her, wheels and propellers. I am convinced that you will find in New York, builders and engineers who will produce a post packet which will fly over the water like a flying-fish—merely touch-and-go. This was indeed the philosophy of Fulton, practiced in a minor degree, for the double purpose of speed and freight; but we are willing to sacrifice freight and even passengers' fees—all for speed. I should prefer, as a passenger, this mode of flying from wave to wave, to flying over the clouds.

The passage over the water would be so short that little coal would be consumed.

Boston, June, 1853.

[If such a line could be supported, we would heartily agitate the subject. There is nothing impractical in it; it is only a question of pay or not pay. A steamship running at an average speed of fifteen miles per hour, could run from Newfoundland to the West coast of Ireland in 5 days 13 hours, allowing the distance to be 2,000 miles, which is not far from the mark, This project will no doubt be carried out at some future period.—ED.

Preserving Strawberries.

As this is the season of the year when this delicious fruit is so plenty, a few directions about their preservation for their future use, will not be out of place.

STRAWBERRY WINE.—Bruise the fruit and press out the juice; then pour over several gallons of water, infuse for twelve hours, and press out the liquor; add this liquor to the juice, and mix with some gallons of cider; dissolve in the mixture sufficient sugar and three ounces powdered red tartar, and then set it to ferment in the usual way; pare the rinds of two lemons and two oranges, and, together with the juice, throw them into the fermenting tub, and take out the rinds when the fermentation is over; some brandy may be added.

STRAWBERRY JAM.—Weigh equal proportions of fine sugar and strawberries; put the fruit into a preserving pan, and bruise and mash it well with a spoon or stick, let it boil up, then add the sugar, stirring it well with the fruit; let it boil ten minutes, skimming it perfectly clear.

The Irish poet who compared the lips of his fair one to "a dish of fresh strawberries smothered in cream," possessed a very *fine taste.*

[For the Scientific American.]

Curious Properties of the Figure 9.

PROPOSITION 1.—Take a number containing two figures, say 83, reverse the figures, which will make 38, then subtract them from the original number, 83, and the difference will be 45—nine times the difference between the two figures 8 and 3, which is 5. Example:

83
38
—
$45 = 9 \times (8-3) = 5$

The following formula shows the fact and reason, taking the value of x equal to 8, y equal to 5, and z equal to 3: $(10x+z)-(10z+x)=9(x-z)$.

2nd.—Take a number containing three figures reverse and subtract as above, and the difference will be equal to 99 times the difference of the first and last figures. Example:

853
358
—
$495 = 99 \times (8-3) = 99 \times 5$

Formula $(100x+10y+z)-(100z+10y+x)=99(x-z)$

3rd.—But if, instead of reversing the three figures as in the second proposition, you place the centre one first, and the last in the centre, then the difference will be 9 times 11 times the first figure less the two last. Example:

853
538
$-315 = 9 + (11 \times 8-53) = 9 \times (88-53)$

Formula: $(100x+10y+z)-(100y+10z+x)=9(11x-(10+z)$

Take a number containing two figures, from which subtract 9 times the first figure, and the difference will be equal to the sum or amount of the two figures added together. Example:

83 added together make 11
72, nine times first figure, 8, subtract
—
11

Formula: $10x+z-9x=x+z$.

5th—Reverse this, and from the two figures take their sum or amount added together, and you will have 9 times the first figure. Ex.:

53
8, the sum of 5 and 3
—
45, 9 times the first figure, 5

Formula—$10y+z-(y+z)=9y$.

A curious result is obtained on the principle of Prop. 5: take, for example, a number containing two figures (a number containing any amount of figures will do as well) say 86 separate each figure into two others containing together the same number of digits, say 5 and 3 for the 8, and 4 and 2 for the six, then you will have 5342; now you may change their places so as to destroy the connection of the 5 and 3 and the 4 and 2; for example, place the 3 first, then the 2, then the 5, and lastly the 4 (or any other way you may desire) then you have 3254; now take the original figures from any part of the number, and you will invariably find the difference to be a multiple of 9. Example:

3254		3254		3425
8 6	or	68	or	6 8
9)2448		2574		2817
272				

If, after this is done, a number is left out of the difference, it can be detected without knowing the figures used in the calculation; for example, if a 4 is left out of the first of the above three examples, you will have 248, which, divided by 9 (or added up until you have only one figure, as 2 plus 4 plus 8 make 14, and 1 plus 4 make 5) will have 5, and you see immediately that there is a 4 wanting to make up the 9. JAMES SWAIM.

Philadelphia, Pa., 1853.

(For the Scientific American.)

Heat—Expansion and Contraction.

A great deal has been said about the different rates of expansion of different bodies, but the rates of contraction seem to have been rather overlooked. Now to obtain a motive power by the means of heat, contraction and expansion are equally necessary. To double the volume of a body is only one half of the work, and to bring it back to its original condition, constitutes the other half. Different bodies are held together by different rates of cohesive power, and in expanding we work against the cohesive power, and in contracting we work with it.

Let x=amount of cohesive power.
Let a=a certain amount of heat.
Then $a-x$=the expansive power.
$a+x$=the contractive power.
And $a-x+a+x$=whole amount of heat used.

It will readily be perceived that whatever may be the value of x the whole amount of heat used will always equal $2a$. This may be further exemplified in the case of the piston of a steam engine with an upright cylinder. If an extra amount of power is required to overcome the weight of the piston in the upward stroke, just so much the less power is required to bring it down again, so that nothing is lost or gained by the weight of the piston. It follows then, that whether we apply the heat to air, water, carbonic acid gas, hydrogen, mercury, or any other substance, the result will be the same. A pound of coal contains a certain definite amount of heat, just as it has a certain definite weight, and it is an error to suppose that by artificial means we can increase either. C.

Paterson, N. J.

Annual Depreciation of Locomtives.

LOWELL, MASS., May 30th, 1853.

To the Editor of the Scientific American:

I noticed in a late number of your paper, you have made an allusion to a statement made by me in the "Railway Times," wherein I say that "an engine destroys itself at the rate of $10 per day, when in full use." I will give you the evidence upon which the statement is made.

"The first cost of the New York and Erie engines is from $7,500 to $10,500, (not from $3,500 to $7,500 as given by you.) The average cost is $9,000 instead of $5,000. The Erie engines run 2,389,271 miles, by the report for the official year of 1852, and the expense of engine repairs was $203,312 48, or eight and a-half cents per mile run. Now by the time an engine has been in full use for twelve years, its first cost and renewals have so depreciated from wear and age, that its sale would not realize half its original cost when new. The first cost being $9,000, and the repairs having amounted to $25,500 (for 300,000 miles run at 8 1-2 cents per mile) gives $30,000, as the total depreciation of the engine, or $10 per day for 100 miles daily trip.

The expense for repairs, as cited by me at five cents per mile, refers to the engines on the Baltimore and Ohio Railway, where with the use of the patent chilled slip tire for drivers, they are enabled to save $30,000 yearly in repairs, above what would attend the use of wrought iron tires.

You show the depreciation of the Erie engines, by my statement, to be $426,000 yearly. The valuation of the Erie engines up to the last report, was $1,349,987 29, not allowlowing for any depreciation. If we allow 8 per cent. for annual depreciation, we have $107,998 98, which added to $203,312 48, the expense for repairs for one year, gives $311,-311 46 for the total annual self-destruction of motive power. Were all the engines of the first class dimensions, and in 'full use,' this amount would be increased far beyond your highest estimate of $426,000.

As I have furnished you with these facts in detail, I trust you will not consider this an extraordinary statement. ZERAH COLBURN.

[The above is from the "American Railway Times" of June 2nd, to which Mr. Colburn is a regular and valuable contributor.

Change in Locomotive Fuel.

A number of experiments have recently been made on the Baltimore and Ohio Railroad by the superintendant for the purpose of testing the economy of coke as a fuel in comparison with wood, which has heretofore been used exclusively. The coke made was from the Cumberland bituminous coal, and the result, we understand, has been so satisfactory that it is intended hereafter to dispense entirely with the wood. The saving of expense has been stated to be about 25 per cent.

About two years ago the Hudson River Railroad Co. bought a quantity of coke for the purpose of testing its merits comparatively with wood. We never heard the result. The time is not far distant when all our railroads will be compelled to stop using wood for locomotive fuel, and the sooner they set about preparing for the change so much the better. It will be a good thing for passengers when wood ceases to be used; the *spark punishment* now inflicted on travellers will then be abolished. As no wood is employed on the English railways, we cannot see how it is that the same fuel used there cannot be used here with equal advantages; the coke from the Cumberland coal may bring about the desired relief.

Salmon Fisheries in California.

The "Sacramento Union" presents some information respecting the salmon fisheries on the Sacramento river, which far transcend all the ideas we ever had of the abundance of such fine fish in any part of the world. It says:—

"The water of the river must be alive with salmon, or such quantities caught daily would sensibly reduce their numbers. But experienced fishermen inform us, while the run lasts, so countless is the number, that no matter how many are employed in the business, or how many are taken daily, no diminution can be perceived. They seem to run in immense schools, with some weeks intervening between the appearance of each school, during which the numbers taken are light, as compared with the quantity taken during a time like the present. No account is kept of the number engaged in fishing, or of the amount caught, and all statements relative thereto are made from estimates obtained from those who have experience in the business, and probably approximate correctness.

These estimates give the number of men employed now in taking fish in the Sacramento at about 600; the number of fish taken daily do an average, 2,000; their average weight seventeen pounds. It requires two men to man a boat, which would give 300 boats for 600 men; 2,000 fish a day would give to each man a fraction over three as his share. Large numbers are salted down daily, several firms and individuals being extensively engaged in this branch of the trade. The fish are put down in hogsheads, which average, when filled, about 800 lbs.

The salmon fish is found in no other waters in such vast multitudes as are met in rivers emptying into the Pacific. On the Atlantic side the leading fish feature is the run of shad in the spring; on the Pacific side, salmon ascend our river at all seasons, in numbers beyond all computation. In California and Oregon our rivers are alive with them, the great number taken by fishermen are but a drop from the bucket. Above this, on the coast side, tribes of Indians use no other food. As a table luxury they are esteemed by most persons the finest fish caught. Unlike many fish they contain but few bones, and the orange colored meat can be served in slices to suit customers. It is emphatically the meat for the million; it costs so little—not a quarter that of other meats—that rich and poor can feast upon salmon as often in the day as they choose to indulge in the luxury. In the course of a few years salmon fishing will extend itself to all the prominent rivers in the State. Catching and curing salmon will then have become a systematized business, the fish consumption will then have extended itself generally over the State, and more than likely become in the meantime an important article of export."

The North Star arrived at Southampton on June 1st, after a passage of 11 days. This was good, but not extraordinary, as she carried no cargo and was in good sailing trim.

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NEW INVENTIONS.

Power Loom for Weaving Hair Cloth.

The annexed engravings are views of a loom invented by John Gledhill, of this city, for weaving hair cloth by power, an invention which is as valuable for the weaving of hair cloth as the power loom for the weaving of cotton cloth. Figure 1 is a front elevation; figure 2 is a longitudinal vertical section; figure 3 is a cross sectional view of a double trough containing the hair for the weft; figure 4 is a side view of certain parts of the same to illustrate a part named the "automatic server," and figure 5 is a front view of the nippers which draw the hairs that form the weft, through the shed of the warp. The same letters refer to like parts on all the figures.

Hair cloth is composed of a warp of linen threads, the weft being hair. As each hair is like a single thread, and has ends of unequal thickness, it (the cloth) has never been woven heretotore but by hand—the fine end of one hair is drawn through to match at the selvedge with the thick end of the preceding hair. It will easily be seen that such a mode of weaving hair cloth is exceedingly expensive and tedious. As the hairs are all like single threads—one hair for each shot—a formidable difficulty stood in the way of weaving such cloth by continual action as in the power cotton loom, where the thread is continuous on a cope, and is shot off in continuous lines. Mr. Gledhill has in a very ingenious manner surmounted every difficulty, and produced a loom for this purpose which does honor to his inventive faculties, and credit to his perseverance. There are also some improvements on this loom, which are applicable to all other looms for weaving cloth.

A is the frame; B is the crank shaft having the main driving pulley on it; C is the harness shaft—the one on which the cams are secured for working the treddles; D is the lay; these parts and the yarn and cloth rollers are the same as those in the common power loom. The arrangement for transmitting motion from the crank shaft, B, to the lay, D, is best shown in figure 2, and embraces an improvement applicable to all looms, viz., a mode of keeping the shed open for the passing of the shuttle or feeder with the weft thread, as long a period as possible during every revolution of the crank shaft, B. The main connecting rod is represented by E, which is the longest part, and is attached to the lay by a pivot, a; F is a link which connects the crank with E, by a pivot, b, which serves also to connect the radius rod, G, which works on the fixed centre pin, b'. The movement given to the lay by this arrangement is the full throw of the crank, the effect of the link and radius rod being to increase the speed during the forward portion of the stroke, and to decrease it during the backward portion of it, and thus keeps it longer in a backward position for the purpose stated.

The loom represented requires only two leaves of harness, but that is sufficient to show an improvement in the harness motion, which is adapted for all cloth looms. Each leaf is suspended at the extremity of two cords, d d', of which d is attached to the right hand end of both leaves, and d' to the opposite end; the said cords passing over pulleys, H H H', which work at the back of the top rail, I, of the frame, and around the pulley, J, whose axle is in the upper end of the rod, K, which works vertically in guides, e e, outside the frame. The rod, K, has a spiral spring, applied to it, to draw it downwards. The bottoms of the leaves of the harness are attached to treddles, L L, which are moved by cams, M M, on shaft, C, in a well known way. One harness is always caused to rise by cords, d, and d', when the other is depressed by the treddles, and thus both are balanced while a proper tension is preserved on each by the action of the spring, in drawing down the pulleys perfectly steady, and thus a most excellent system of harness balancing is carried out. These two combinations and arrangements of machinery belonging to this loom are adapted to other looms; we will now describe the entire new arrangements parts, and combinations for weaving hair cloth by this loom.

The line passing over the rollers behind the lay represents the warp; the quadrangle representing the shed or opening of the yarn of the warp by the heddles or harness to allow the hairs to be drawn through; M' is a hopper for containing the hairs each by itself standing in water; this hopper has two compartments, one for containing hairs with their thickest ends uppermost; the other containing hair with the smallest ends uppermost. One hair is taken from each bunch alternately, so as to lay a thick and fine end alternately together for the weft. This hopper is attached to the left hand of the loom, and there are two troughs, g g, arranged parallel with each other side by side, as shown in figure 3. A narrow slit is made transversely across the bottoms of both, and the ends of the hairs extend from the hopper, M', into these troughs protruding through, to be caught, as we shall explain, by the automatic feeder. A cord, i, is attached to the frame at the side of the troughs, and passes through the slit, h, above the bunches of hair, and has a weight, N, suspended to it, which keeps the hair tight in the trough.

Attached to the loom breast beam is the arm, O, which carries the automatic server; this arm is adjustable back, forth, and sideways; P is a square head pivoted at the side of the arm, and has on its face four studs, k, one of which is caught and acted upon by a hook, l (attached to the lay) every time the lay recedes, in such a manner as to perform

Figure 1.

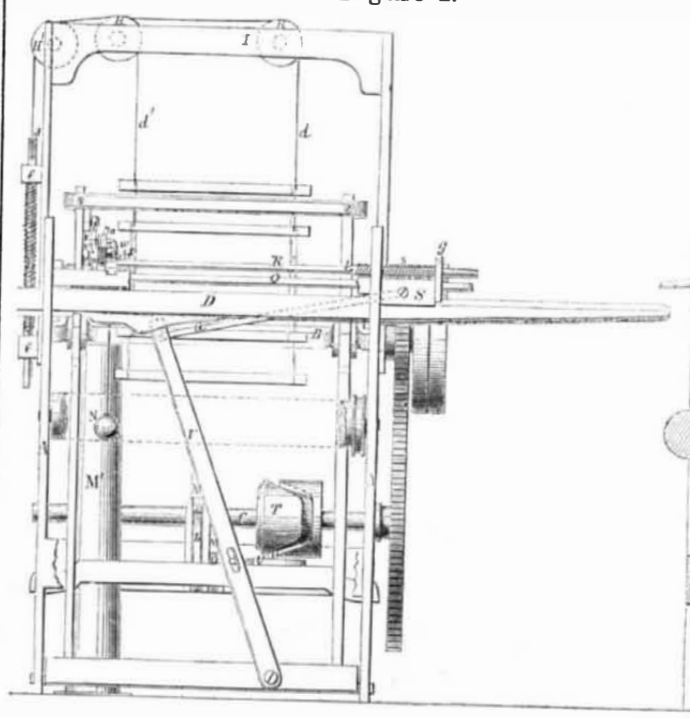
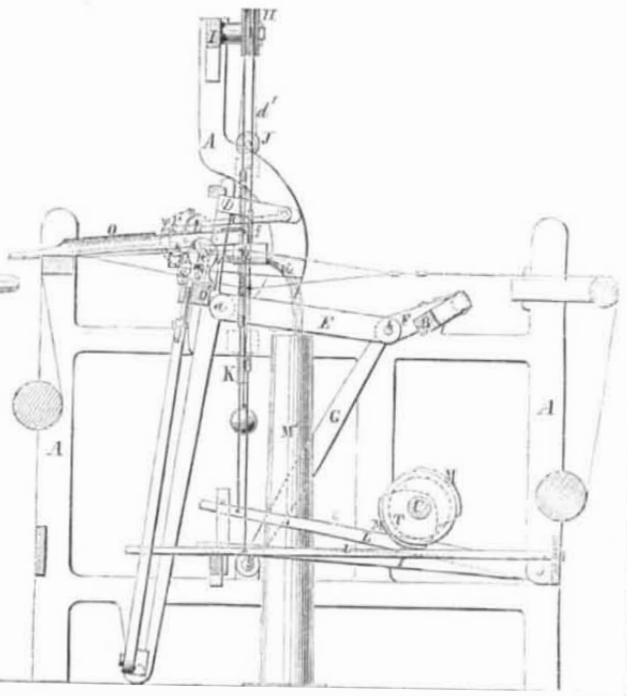
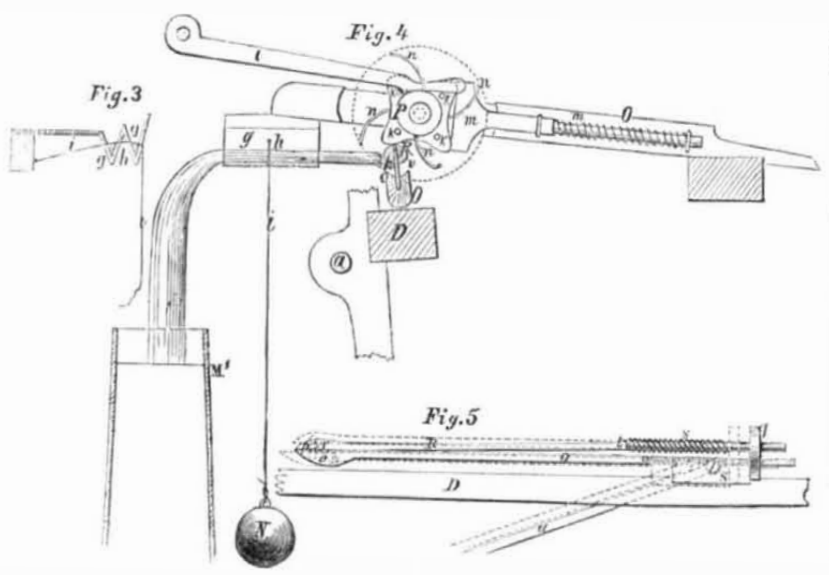


Figure 2.



one quarter of a revolution, it being prevented from turning further by a spring bearing piece, m, which is forced against the back side by a spiral spring, m', the spring yielding to the operation of hook, l, but preventing the head being turned accidentally. On each of the four sides of head, P, there is a serving hook, n, made of a curved piece of steel secured by one end to the head, and having a V-shaped notch cut on its outer end. These hooks require to be alternately at opposite ends of the hairs, their notches being opposite the centres of the troughs, g g, of the hopper. Every time the lay recedes after a beat up, the hook, b, turns the head, P, and one of the serving hooks, n, takes a single hair in its notch, and draws it forward from the hopper, M', to such a position that a pair of nippers will seize it, and draw it through the weft thread. For some kinds of work, it may be necessary to take two or more hairs at a time, and for this purpose, the serving hooks can be made with two or more notches, but to take one hair at once, the notch of the hook must be made of a size to take in no more. These hooks never fail, as they revolve [illegible] especially as the end of each hair is prepared to effectually accomplish this object.

The nippers by which the hairs are pulled through the warp consist of two long rods, Q R, figure 5, terminating in jaws, o p; these bars must be long enough to extend clear through the warp, and leave the jaws protruding on one side, and a considerable portion of their length on the other. The right hand



end of the lower rod, Q, is rigidly attached to (though it may be adjustable on) a block, S, which is capable of sliding on the sole of the lay. The right hand end of the upper rod works freely through a guide, q, attached to the block, S, and is connected near the point of the jaw by a radius link, r. It has a spring, s, coiled round it within the guide, q, which always tends to close it, and on its back side there is a work stud, t, projecting from it.—The nippers are caused to pass quickly through the open shed while the lay is finishing its backward motion, and grip the hair, v which is held in readiness by the server, and then return with it through the open warp, by a transverse motion given to block, S, by revolving cam, T, on the harness shaft acting upon the horizontal vibrating lever, U, which operates the picker staff, V, to which is connected an arm, u, attached to the nippers, and which works them exactly like the power loom picker staff. While the nippers are passing through the shed to fetch the filling—hair, they are kept closed by a spring, s, until the points of the jaws have passed through the shed, and have arrived opposite the server, when the stud, t, comes in contact with the right hand sword on the lay, or a suitable stop, which holds the upper part of the nippers back, raising it by the radius link, r, fig. 5. The jaws of the nippers being thus opened, a hair is received between them, and when the return stroke is about to commence, the upper jaw, p, descends and takes a hair from the serving hook, embracing it firmly and carrying it through the warp. The lay is then beat up, and a shot of weft completed. The nippers have a forward and back motion for one shot of weft.

A spring drag is secured to the loom to [illegible] tion of the nippers. In this loom, one inch of hair lost in the hand loom every shot, is saved, which amounts to a great deal in the length of a web. The operations we have described by this loom, will show that the useful results obtained are designed to affect an entire revolution in the manufacture of hair cloth.

Measures have been taken to secure a patent, and as the invention is quite a novel one, the claims are extensive.

A new Journal Box.

A new journal box, intended more particularly for railroads, has been constructed by G. V. Alden and John Smith, of Hornelsville, N. Y., the objects which are accomplished by the invention, are a more perfect method of lubricating the axle without the possibility of the lubricating material being unnecessarily wasted, and also allowing the necessary play of the axle in the box, without permitting dust to enter the bearing. The centre of the box is provided with a circular reservoir for oil in the usual manner. Two circular chambers are also cut, one in each end of the box which chambers receive thick collars nicely fitted to and forming the bearing for the axle; these collars fill the circular chambers, and rest upon a spring at their periphery, so that the axle may have a slight play at each end the box, and still be closely fitted to the collars. This prevents the escape of oil and prohibits the approach of dust or dirt. Measures have been taken to secure a patent.

Models for Inventions.

Inventors will perceive by reference to an advertisement in this number, that they may obtain models for any kind of machinery by addressing Mr. Fairbanks, at this office. This will accomodate those inventors who have frequently inquired of us where they could get a model constructed to represent their inventions.

Sufficient stock has been subscribed in Baltimore to build a steamship to run between that city and Liverpool.

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Scientific American

NEW-YORK, JUNE 18, 1853.

Management of the Patent Office.

The Patent Office is one of the most important departments connected with our government. It was organized for the purpose of promoting the progress of discovery and the useful arts, and to protect the peculiar rights of inventors, a class of men who have done more for the advancement of civilization, and the honor and greatness of our country, than all the political economists that have ever lived. The steam engine, the cotton gin, the spinning jenny, the power loom, the telegraph, the sewing machine, and all other useful inventions, are iron apostles of civilization; they convince without arguing, and subdue all opposition by the eloquence of action. The management of the Patent Office—administration of the laws which regulate the issue of patents—is therefore of great consequence, not only to inventors, but the whole people. The Commissioner of Patents, as the supreme head, should be acquainted with the laws of patents, a man of good judgment, of scientific ability, candor, and impartiality. The examiners should be men possessed of a thorough knowledge of the machinery and articles in their several departments, patient in investigation, industrious, sensible, generous, and impartial, so that no injustice should be done by them to any applicant for a patent. Good men, although liable to make mistakes (for none are perfect) are always willing to rectify the same when they are pointed out; while bad men, under the best laws, cannot be trusted in any capacity.

The present Commissioner of Patents—Judge Mason—has given evidence since he entered upon the duties of his office, of great ability and uprightness. He has changed the policy which was pursued by the Patent Office for a short time, and which we condemned on page 247, in reference to retaining all the fee for rejected applications on which caveats had been filed. According to the thirds of the fees on rejected applications will hereafter be returned on all withdrawals; and we have no doubt but every useful reform which Judge Mason in his wisdom deems necessary to the good aministration of the Patent Office affairs, will be carried out at the proper time and in the proper manner.

At the present time the Patent Office is far behind, at least six months, in the examination of applications. This is very trying to the patience of inventors, and sometimes injurious to their best interests. The business of the Patent Office should always be in such a state that no application should be longer than one month in the office before it is examined. When men in any office are crowded with business, their work is oftentimes but very superficially performed. At the present moment the examining corps of the Patent Office, although very diligent, are not strong enough in numbers to perform their incumbent duties so promptly and thoroughly as they should be fulfilled. Examiners have sometimes had much extra labor, unpleasant and extended correspondence, owing to hasty adverse decisions. An applicant for a patent should always have the benefit of a doubt in the mind of an examiner, for a trial at law, after all, is the only real binding cord of legality.

We hope that during the next session of Congress, an addition will be made by law to the examining corps, so as to render every department complete and effective. The present Commissioner will then have been in office to see and know exactly what is wanted, and will be the most proper person to institute and recommend such measures as will make the Patent Office the best managed of any in connection with our government.

To Correspondents.

No matter what your communications treat upon, we require you to furnish us with your proper name and residence in full, or no notice whatever will be taken of them. We have repeated this statement frequently, and still receive annonymous letters. They are destroyed as soon as received.

Patent Agents—A Caution.

It is well known to many of our readers that there are located in the City of Washington a vast horde of self-styled "solicitors," who profess to undertake all kinds of professional business before the different departments of the Federal Government. This class of solicitors are for the most part shipwrecked politicians, who hang about the corridors of the public buildings, something after the style of the "Peter Funks" of this city,—ready, with the most obsequious politeness, to undertake all kinds of jobs, and for very small fees. Of course, having once, perchance either by implication or in fact, been the suckers of government pappage, they are supposed to understand the "ropes," and of course have more influence in the proper direction than any other class of men.

The apparent success of these professional gentlemen has had its influence upon many uninitiated into the mysteries of "official life;" and as a consequence growing out of it, Washington has become a sort of Mecca for young men thirsting for renown and money, who imagine that they are there easily attainable and flow directly from the large annual appropriations made by Congress.

The class of men we are now considering have really nothing but windy pretentions, which they display in long and tolerably ingenious circulars of information to the public. It is quite notorious that worth and respectability in professional life suffer in character and business on account of these false pretenders. This is naked truth, and is apparent to all familiar with the peculiarities of Washington.

There are also located near the Patent Office a class of men known as Patent Agents; we are acquainted with several of the highest respectability, who are justly entitled to public confidence, yet, after all, they suffer in their business and reputation by pretenders, who back their claims by professional circulars of "wondrous length and thundering sound," addressed to inventors and patentees, promising the most brilliant results.

We feel called upon, as an act of justice to ourselves and other respectable Agents, to caution inventors and patentees against all such characters,—they are unreliable, and, like sharks, feed upon humanity, whose vitals they search after, not only in the streets and public buildings of Washington, but throughout the whole country. This nuisance became so intolerable during the administration of Mr. Burke, that he was compelled, to save the Patent Office from the disgrace of this besieging army, to post circulars of warning along the walls of the Office. This checked their operations somewhat, so far as the Patent Office was concerned, and their theatre of operation then extended to the country, so that now almost every issue of the Scientific American brings to us letters of inquiry—illegitimate fruit—in reference to some Agents who pretend a desire to purchase rights in an invention, perhaps not patented, and who accompany the request by enclosing a professional card, so obscure in its meaning as to lead some of our clients into the belief that they are our Washington Agents. These men derive their information about inventions and patents from notices in the columns of the Scientific American, and to some inventors they are no better than horse leeches.

We wish our own clients distinctly to understand that we are our own Agents, and act perfectly independent of any support in or around Washington. The horde of Agents who thrust their pretentions upon inventors and patentees, have infinitely more *profession* than real merit, and cannot, as a general thing, be relied upon; they are also vastly increasing, and now swarm like the locusts of Egypt,—the public must either steer clear of them or suffer themselves to be stung.

Without wishing to create a false impression in regard to worthy Patent Agents near the Patent Office, we will state, that whenever any of our readers wish to employ reliable agents in Washington to transact any business with the Patent Office, we will, upon application, furnish them with the names of responsible men. We have very reluctantly thrust this subject into our columns. We have done it to caution the public against those who have no merits of their own, but endeavor to build themselves up at the expense of reliable and able men, and much to the cost of their clients.

Low Pressure Engines on the Western Waters.

We understand that a low pressure steamboat named the "Jacob Strader," has been recently built for the Cincinnati and Louisville Mail Co., to run on the Ohio river. All the steamboats running on the Western Waters are driven by high pressure engines, but this boat is not the first low pressure that has been tried on the Ohio or Mississippi. Excellent low pressure steamboats have been faithfully tried on the Mississippi, but failed to work well in such muddy waters excepting for a short time, and hence they were abandoned. At the present moment there are 1,205 steamboats in the United States, and out of that number there are only 362 with low pressure engines—all the rest being high pressure; the latter are nearly all employed on the Western rivers; Pittsburg has 101 high pressure boats; Cincinnati 104, St. Louis 126, New Orleans 111 and Buffalo in New York has 34—the rest being owned in various other cities South and West, and a number on the north-western lakes. The great number of steamboat accidents in our country caused by the explosion of steam boilers, is to be attributed to the great number of high pressure engines employed. It has long been a desideratum to obviate the dangers of explosions, and there can be no doubt that if the proportion of our high pressure to those of our low pressure steamboats were reversed, the number of boiler explosions would decrease exactly in the same ratio. On the Ohio river, where there are so many high pressure boats, the extra weight of the machinery for low pressure boats has always been a great obstacle in the way of low pressure boats on that river, owing to the very low state of the water during the dry period of the year. As no effort hitherto made to introduce low pressure boats on the Western waters, has proved successful—every one being a practical failure—we cannot place much confidence in any new effort: not, at least, until it has had a fair trial for some time. Some have supposed that the incrustations formed on the boilers of our Western boats contained considerable of the chlorate of potash, and that when the boiler flues, by neglect or otherwise became red-hot, this substance exploded and tore the boiler to fragments. Others believe that all the explosions on the Western boats are attributable to overpressure of steam, and look upon the incrustation theory as a chimerical one.

Were it possible, however, to prevent scale in the boilers of our Western steamboats, by the use of pure feed water, and at the same time use condensers, grand and useful results would be obtained. Is it not possible that a good surface condenser may yet accomplish these two objects? What has become of the information which should have been spread befor the people more than a year ago on the subject of steam engines, condensers, boilers, &c., by a Committee appointed by the Secretary of the Navy, which took nearly two years to collect information. It appears to us that after so much labor and money spent, the people should know whether the members of the Committee performed their duties in a proper and masterly manner, or whether they neglected to do so. We hope that low-pressure condensing steamboats will yet be rendered practicable on our Western waters, for they are by far the most comfortable in every sense for passengers, and besides, they are more safe, with respect to lite, and more economical with regard to fuel.

Ericsson on the "Ericsson."

In the last number of "Appleton's Mechanics' Magazine," there is an article from Capt. Ericsson on his Hot Air Engines. From the exciting advertisements published about this article, as being something wonderfully great, we thought before we read it, that some acute and able reasoning, worthy of an answer, would be presented. But instead of this we have been disappointed. We advise every reflecting practical engineer to read it for himself, to be convinced; that it is nothing but a batch of nonsence. We quote the following extract:—

"I have repeatedly stated that the yielding of the wrought-iron heaters has prevented full pressure being carried, and I have so reported to Government. Strange to say, those who have written on the subject appear not to comprehend the importance of this fact, nor its true bearing on the question. They all confound the caloric engine with the steam engine. In the latter, when reduced pressure is carried, the consumption of fuel is reduced in an equal proportion—not so in the caloric engine. The principal source of heat being the regenerator, neither speed nor pressure exercises any material influence on the quantity of fuel consumed. I must here emphatically record the fact, that the quantity of fuel consumed in turning the wheels at the dock, at 4½ turns per minute, differed very little from the quantity consumed under way, making 9 turns a minute. The reason is obvious; the losses by radiation, and the heat passed off through the chimney, &c., remain constant, whilst the capability of the regenerator changes with the speed, density of air, and temperature. By increasing these the power of the instrument increases in equal proportion; the more heat it receives in a given time, the more it gives back."

Capt. Ericsson has also stated that his wrought iron heaters would *not* yield. Those who have written on their yielding have comprehended the *difficulties*, if not the importance of the same, and the owners of the Ericsson now feel it. It is not true that the hot air engine (caloric engine is a wrong name) has been confounded with the steam engine, and it is not true that reduced pressure in a steam engine reduces the consumption of fuel. If he had said that high pressure steam used expansively, reduced the quantity of fuel he would have been correct. If the regenerator is the *principal* source of heat, why in the name of common sense does he use any fuel at all. It seems that the fuel his engine consumes is a sequent of his regenerator, and by this logic it is not the heat produced by combustion which moves his engine, but his regenerator—some packages of wire gauze. The "regenerator" of the hot air engine is a humbug; it seems to humbug Capt. Ericsson and all the groundlings who believe that a certain quantity of heat can produce repeated effects upon innumerable quantities of matter—a perpetual motion idea of the most absurd character.

Propellers.

A number of fine steam propellers, of moderate tonnage, have lately appeared on our waters, and more are in progress of construction. A line of schooner-rigged propellers ply between this city and various places on Long Island Sound. They are well built and run very fast. A new line of propellers has been established to carry freight and run on the North River between New York and Albany. The first one of the line has been built at Newburgh. The boat is of large dimensions—160 feet keel; 29 feet 4 inches breadth of beam, 8 feet depth of hold. The machinery consists of two double cylinder engines, direct action, formed upon an improved principle, the invention of John Baird, of the Highland Iron Works. The piston of each cylinder is connected to the crank-wheel pin of the Propeller-shaft, directly under it. The condenser and air-pump are placed between the cylinders; the air-pump being horizontal and double acting, receiving its motion from a link attached to one of the slides. The engine is on the Wolte principle, but is new so far as regards the construction and arrangement of its parts.

Commissioners to the New York Crystal Palace.

On the 10th inst., the British ship Leander arrived at this port with the Earl of Ellesmere on board, as the chief appointed British Commissioner; Sir Charles Lyell arrived the week before at Boston, Prof. Wilson, Messrs. Dilke, Wallace, and Whitworth, other Commissioners have also arrived. The Earl is accompanied by his lady, the Countess of Ellesmere, his son and two daughters.

The Earl is altogether too fast for our Crystal Palace folks. We believe it is his intention, as the Crystal Palace is not yet ready to open, to proceed immediately to Niagara Falls, and thence to Canada, where he will remain until the middle of July.

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Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JUNE 7, 1853.

CONVERTING ROTARY INTO RECIPROCATING MOTION—By Henry Baker, of Catskill, N. Y.: I claim the ring, with its sliding pins attached to the object to which reciprocating motion is to be given, in combination with the stud, or its equivalent, attached to the endless chain, the points or ends of the said pin being caused to project through to the interior of the ring, to catch the stud or equivalent, and being withdrawn alternately, to allow it to pass, by springs, levers, and stops, as described.

[See description of this invention on page 316, Vol. 7, Sci. Am.]

WASHING MACHINES—By T. A. Dugdale, of Richmond, Ind: I claim combining the wash boards, cords, and floats, as described.

PROPELLERS—By Henry W. Hewet, of New York City: I claim giving to the paddles, in their circuit, a greater longitudinal than vertical motion, imparted by a crank motion, as specified, in combination with the vibratory motion of a beam or beams, derived from the same crank motion, for the purpose sepecified.

Also, in the combination above specified, making the beam or beams, slide on the fulcrum or fulcra, as specified, by means of which additional element, in the combination, I am enabled to impart to the paddle or paddles, the back motion, in the direction of the propelling action, more than the lower half of the crank motion, as set forth.

COMPOSITIONS FOR TREATING WOOL—By Wm. S. Hubbell & Amos Barrett, of Kingsville, Ohio: We claim treating wool with a composition of oil and alcohol, to prepare and fit it for the several manufacturing operations, for which oil has been and is now employed.

(See description of this invention on page 65, Vol. 8, Sci. Am.)

DOOR FASTENER—By S. P. Kittle, of Buffalo, N. Y.: I claim the construction of the bar, having the edges, with the stop or rest having the lips constructed and arranged as described.

Also, the combination of the cap with the bar, the effect of the cap being to fill up the space between the edge of the door, when closed, and the casing, as described, all for the purpose and manner as set forth.

BOILERS FOR COOKING STOVES—By R. W. Belson, of Philadelphia, Pa.: I claim the employment of a valve, in combination with the escape tube of culinary boilers, such valve being controlled by the cover, or in any equivalent manner, as set forth.

KNOB BOLTS—By Oliver Ellsworth, of Hartford, Conn.: I claim, first, the [illegible] applied to the tumbler of the lock, for the purpose of preventing the bolt being forced inward, by means of any instrument from without, as described.

Second, I claim, in combination with the pin and spring, the oblique sides or angles, cavity or opening, made in the side of the case of the lock, for the purpose of converting my lock into a latch, or restoring the connectian between the outer knob and spindle, by means of the rod pin coming in contact with the oblique sides, when the inside knob is turned, thereby turning the spindle and causing the rod pin to be moved out, by reason of the friction of said rod pin upon the sides of said cavity, as set forth.

Third, I claim the introduction of a key through a door knob, for the purpose of turning the spindle of the lock, thereby causing a lock to be converted into a lock (from the outside) as described.

Fourth, I claim the thumb pin or disconnecting pin, which passes through the outside knob, and into the spindle, thereby forming a connection with the rod, for the purpose of converting the latch into a latch at pleasure, from the outside of a door, as set forth.

HOSE COUPLING——By R. J. Falconer, of Washington, D. C.: I claim the employment of the slide coupling, in combination with the collars of hose, as set forth, by which I am enabled, in the case of water hose, to effect the coupling with the utmost facility, while the water is flowing through the hose

QUARTZ PULVERIZER AND GOLD AMALGAMATOR—P. G. Gardiner, of New York City: I claim the arrangement of the vibrating, pulverizing basin and amalgamating basin attached thereto, with the screen interposed between the two, said basins being converted to the same shaft, and constructed and operating as described.

(This is believed to be a very valuable invention Patents have been taken in foreign countries through our Agency.)

WATER CLOSETS—By Herman Goldsmith, Jr., of New York City: I claim the annular water chamber at the upper part of the closet, with a valve so arranged as to open when the pan or basin closes, and allow a requisite quantity of water to pass around the sides of the pan or basin, and between the sides of the pan or basin, and the flange of the orifice, thus hermetically sealing the orifice, and preventing the escape of effluvia, said valve also closing, when the pan or basin is opened, and thus preventing the escape of water from the chamber, the valve being constructed of a sphere or ball, working over a circular opening in the bottom of the water chamber, or constructed in any other manner. I do not claim the water chamber independent of its valve, to operate as stated.

PAINTING ON CLOTH—By Leon Jarosson, of Jersey City, N. J.: I claim the painting upon cloth previously prepared with the mordant described, that will combine chemically with colors laid on over the other, and blended by means, substantially as described, by which I give great richness to the figures, whilst the tint of each is carefully preserved, and developing and fixing permanently the colors, by steam, and restoring the cloth to its natural pliable state, by washing out the excess of coloring matter, as described

PLATFORM FOR FERRY BRIDGES—By Gerard Sickels, of Brooklyn, N. Y: I claim applying or attaching to a ferry bridge or other boat landing, a movable platform, so arranged with any suitable mechanism, as to be operated upon by the boat, as it approaches the bridge, in such a manner, that the boat causes the platform to move inwards and downwards, when the boat is coming into the slip, and the mechanism, or weights described, or their equivalents, cause the platform to follow the boat outwards and upwards, when the boat is leaving the slip.

(We recommend this invention to the consideration of our ferry companies, it is a humane invention, and one that should be introduced on every ferry route.)

SCREW PRESSES FOR PACKING BOXES—By Geo. W. Wight, of New York City: I claim bending the upper portion of the arms or levers from a vertical position, and tending towards each other until they reach and are joined to a cross piece or yoke, by joints, at any desired point between the centre of said yoke and the vertical portions of the uprights, thereby giving an oblique or inward direction to the hooks when the yoke is caused to rise, by the operation of a vertical screw.

(See description of this invention on page 116 Vol. 8, Sci. Am.)

BORING ROCK—By Ebenezer Talbot, of Windsor, Ct: I claim the method, as described, of applying a rollet cutter or cutters, for boring or excavating tunnels and other apertures in rocks or other hard substances, by causing the said rollet cutter or cutters, or sets of rollet cutters, to cut segments of circles from the centre, or near the centre, to the periphery of the tunnel, or other excavation, with the concavity towards the machine, in combination with a motion or motions around the centre of said tunnel, to cause the said cutter or cutters to act in succession, on the entire surface to be cut away, as described.

ARTIFICIAL STONE—By Julius Hornig & Ludwig Suess, of Union Hill, N. J.: We claim the mode or process of forming artificial stone as described, that is to say, we claim the employment of silex, alumina, and salt, mixed and treated as set forth, and in the proportions, designated in the manufacture of artificial stone, meaning by salt the chloride of sodium, or its equivalent, as set forth.

PAPER FILES—By H. L. Smith, of Cleveland, O., (assignor to H. L. Smith, of Cleveland, O., and Levi Buttles & H. A. Swift, of Ravena, O.): I claim the paper file described, with prepared adhesive leaves or margins, as a new article of manufacture.

PUMPS—By L. P. & Wm. F. Dodge, of Newburg, N. Y.: We claim the combination of the cylindrical piston, constructed as described, with its valves and the induction and eduction passages, so that the water, all entering said cylinder, under pressure, alternately, at its ends, and being discharged under pressure, through the opening or openings, at its side.

We also claim the combination of the piston heads without the cylinder, with their valves, and the induction and eduction passages, when these valves are united (to insure simultaneous action), as described, the water entering through the piston heads, into the space between the same, and being discharged therefrom, through a lateral eduction orifice, the whole being arranged as described, thus dispensing with chambers and partitions, in the barrel and valves at the eduction port, preventing leakage, and rendering the pump or engine, more simple and effective, and less liable to derangement

(See notice of this invention on page 388 Vol. 7, Sci. Am.)

RE-ISSUE.

COOKING RANGES—By Moses Pond, of Boston, Mass.: [illegible] ments by which the hot water back is connected with the plate, and by means of which said hot water back may be either readily removed, at any time, or applied in such manner that the directions of its water pipes may be disposed, so as to accommodate the bath boiler, into which they are usually led, on whatever side of the range the said bath boiler may be placed; the said improvements consisting, first, in the connecting piece, and the attachments of it, and the hot water back, the whole being made to operate together, as set forth.

Second, in a second set of attachments (fixed on the opposite face of the water back) in combination with the first set thereof, as described

I also claim the peculiar arrangement of flues, which lead the smoke and volatile products of combustion directly around the oven, the said arrangement of flues causing the heat to course against a portion or one half of the bettom of the oven; next into another flue, which takes it backwards and against the other portion or half of the bottom of the oven, thence up a flue against the oven, thence through a flue extending over and against a portion or half of the top of the oven, thence into and through another flue, which carries it backwards and over and against the top of the oven, and conveys it to the chimney or discharge flue, not meaning to include in such arrangement the radiating chamber or space.

I also claim the two recesses and two flue plates applied to another plate, in combination with the two valve openings, their damper and cover plate, as applied to the top plate of the oven frame, and used under an arrangement of oven flues, substantially as described, the same allowing of the adaptation of the oven, to either side of the fire place, or the use of two such ovens and their frame, in connection with the fire place, as stated.

I also claim the improvement by which the oven can be raised and readily removed and by which the smoke is prevented from passing underneath the partition which separates the flues on top of the oven, the same consisting in the sliding or gravitating plate affixed to the partition and made to operate, as specified

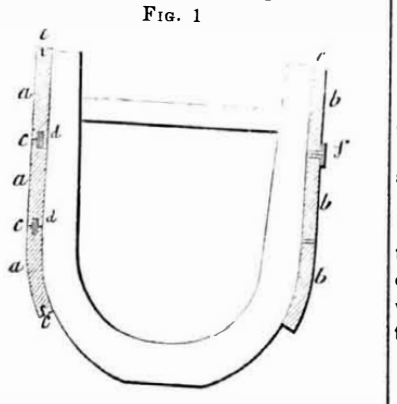
[NOTE—Seven of the patents embraced in this week's issue were secured through the Scientific American Patent Agency.

Manufacture of Bohemian Glass.

A French company, of ample means, have purchased a tract of land at a short distance east of the Crystal Lake, near New Rochelle, where they have commenced the erection of a magnificent establishment for carrying on the manufacture of Bohemian Glass Ware.—The "Westchester News" states that the buildings will be of brick and stone, and put up in the most substantial manner. The principal building fronting the turnpike road, will be upward of 300 feet long, and four or five stories high; while in the rear there will be several other buildings of smaller dimensions, adapted to the wants of the various branches of the business. One furnace alone will occupy a space of fifty feet square. The whole work is to be pushed most vigorously; as soon as finished quite a colony of workmen and their families are to be brought from France to carry on the business, which is expected to be very extensive. For the accommodation of the French families who are expected to be employed in the establishment, about fifty dwellings will be erected by the company. New streets are being laid out around the works.

B. F. Cooke's Mode of Calking Vessels.

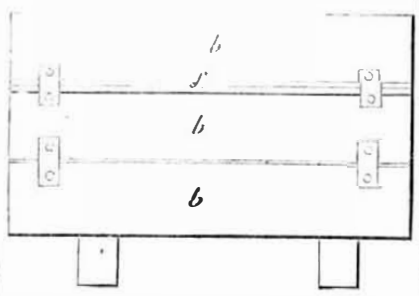
FIG. 1



In the construction of vessels the process of calking the seams so as to exclude the water, forms an important part of the operation. This has heretofore been done by champering the outer edges of the planks, and then driving oakum or other similar material between them. An objection to this mode of calking is the well-known fact that the working and straining of the vessel has a tendency to throw the oakum out, and render re-calking necessary, while, at the same time, as the planks are not driven so close together, and consequently cannot form a close joint; the hull will be less stiff and rigid than is desirable.

The improvements represented in the annexed engravings obviate these objections, and consist in rendering the seams watertight by placing between the edges of the planks some adhesive elastic substance or material, such as india rubber, gutta percha, or compound of both. This may be done by [illegible] each plank, and placing in the said groove a strip of india rubber, gutta percha or other elastic material, and then driving the planks

FIG. 2.



closely together, the edges of the planks not being bevelled but square, so that they will form a close rigid joint. If desirable, it may be coated with a rubber cement, or compound.

In the engravings, fig. 1 represents a side elevation of a portion of the hull of the boat, and figure 2 a transverse section, representing two methods of introducing the elastic calking above named, a different method being shown upon each side of the boat.

b b are the planks upon one side of the vessel, and *a a* those upon the opposite side; *c c* are the joints which are calked by grooves, *e*, plowed in the edges of the plank, as shown, into which the long strip of elastic calking is introduced. This strip of calking may be round and tubular, or of any other required form, so as to fill the channel, which may also be of any shape desired—the planks thus grooved or plowed are then driven together, with a coat of elastic cement between them if it is thought advisable. The calking introduced between the planks, *b b*, as at *f*, is of a different form from that at *d d*; in this place the planks are not grooved as in the other instance, but are planed square, and a flat piece of the elastic calking doubled and placed between the edges, thus inlaying all the joints by the elastic material. The edges of this calking may overlap the external corner of the plank, as shown in fig. 2 at *f*, and connected to the plank upon the outside, or the joints may be simply inlaid without the overlapping, as may be required. It will also be seen that the ends of the planks and the seams of the upper works, or other parts of the vessel, may be calked in the same manner. By the above method of calking a vessel, it will be seen that the necessity for chamfering the edges of the plank is entirely obviated, and by cutting the edges square, and placing between them an adhesive elastic substance, the joint will be impervious to water, and at the same time the hull remain extremely stiff and firm, while the calking cannot be worked out by the straining or working of the vessel, as frequently occurs in the method of calking heretofore practiced. Further information may be obtained by letters addressed to the inventor, B. F. Cooke, of Boston, Mass. Mr. C. has taken the necessary measnres to secure a patent.

By the latest news from Europe, it appears that the celebrated city of Nankin had been captured by a powerful army of revolutionists who will, to all appearances, soon overthrow the present Dynasty.

TO CORRESPONDENTS.

S. B. B., of Vt.—The mere application of any well known substance to a new purpose is not patentable, and your invention is simply one of adaptation.

E. W. S., of Mass.—The Patent Office Reports for so many years back could not be obtained for any price.

S. G. C., of Pa.—We do not see the least advantage that you can obtain by using the carbonic acid gas from the fire, mixed with the steam, to operate your engine.

J. H. F., of Vt.—We should be pleased to have you form a club of subscribers for the Scientific American, but we cannot offer you other inducements than those laid down in the prospectus.

P. ——, of Mass.—Yours has been received and will meet with attention.

W. P., of Pa.—Your deductions appear plausable, but they will not account for all the phenomena we observe; how does it account for the various colored grains? have you tried the effect of preventing the pollen from falling upon the staminate at all. Experiments alone will determine the true theory.

L. P., of Pa.—Your argument is ingenious, but it is founded upon an erroneous view of the effects of heated air; we refer you to the views embraced in [illegible] and philosophers say and we believe, but experience truth is mighty, and our views will be found to be correct; we are nowise uneasy about the future, it will, and is, developing the sound doctrines promulgated in the Scientific American respecting Pulley, Static Pressure and Caloric Engines, Water Gas, Fire Annihilators, etc.; we mean to protect our own readers: for them we devote our energies; we are satisfied with our past labors. You find fault with our plainness; we care not for this, we expect it.

S. L. B., of Mich.—You are correct, compressed air passing into water will absorb a portion of caloric from the water and render it cool; for an application of this principle see the air-cooling apparatus in No. 38, this Vol. Sci. Am.

S. L. H., of Ill.—Yours is not "a worthless fancy," as you state, but very ingenious; you must, however, see "House's Telegraph," when you will be convinced that he has produced a machine carrying out the same idea

A. C. S, of N. Y.—Different gases have different specific gravities: air is 0·9038, carbonic acid 1·383; air is 815 times lighter than water; a cubic foot of carbonic acid gas is therefore 532 times lighter than a cubic foot of water, which weighs 62·5 lbs.

J. B. C., of Ohio—We do net see any chance for you to get a patent on the head rest for cars. The same thing, substantially, has been long known and used. You had better not apply.

A. H., of Pa.—We have examined the sketch of your improved compound car axle, it contains no new or patentable feature, and you are advised to drop it; several pertinent references could be given.

D. P. Z., of Ct.—You do not appear to be aware of the fact that dry meters are well known, also the use of bellows as an attachment thereto; yours is differently arranged from any other known to us, but the water meter is superior to any other. If yours is useful it is patentable, we think.

Money received on account of Patent Office business for the week ending Saturday, June 11:—

J. E. A., of N. Y. $30; E. P., of Ill., $10; S. B. & Co., of Mass., $25; W. W., of N. Y., $30; W. S. of Pa., $35; W. G. M., of N. Y., $25; S. & K., of Mass., $30; J. H., of N. H., $15; V. S. (assignees), Belgium, $342; J. P., of Ky., $60; A. A., of N. Y., $55; W. A. H., of Canada, $500; J. S., of Va., $20; J. S. B., of Pa., $50; T. H. T., of N. Y., $10; J. McG., of O., $20; G. & B., of N. Y., $30; A. D. G., of L. I., $22; C. M., of N. Y., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday June 11:—

W. C., of Ga; R. S. T., of N. C; J. H. of N. H.; S. & K., of Mass.; W. G. M., of N. Y; A. R., of L. I J. E. A., of N. Y.; J. H., Jr., of Wis.; J. T. D., of N. Y., W. G. M., of N. Y.

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ADVERTISEMENTS.

Foreign and American Patent Agency

IMPORTANT TO INVENTORS.---The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon the most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents.

MUNN & CO., Scientific American Office,
128 Fulton street, New York.

MODEL FACTORY—Models for all kinds of Machinery are made with neatness and despatch, and warranted to answer the requirements of the Patent Office Any person wishing a model constructed must furnish a description and sketches; if necessary, enclosing the required charges, and his communication will receive prompt attention. Address JNO. B. FAIRBANK, 128 Fulton st, Scientific American Office. 40tf

SIXTH ANNUAL EXHIBITION OF THE MARYLAND INSTITUTE, will open at the unrivalled Hall of the Institute, in the city of Baltimore, on Monday the 3rd day of October, 1853, where articles for competition and premium will be received from Monday, 26th, to Thursday 29th of September, inclusive; after which deposits will be entered for exhibition only. To this Exhibition the artists, inventors, manufacturers, &c., of the entire union, are cordially invited to contribute. The central location of Baltimore, and the high reputation of the Maryland Institute Fairs, will afford them very great advantages in introducing their articles to the public, as there will congregate a great number of persons from every part of the Union. Circulars and any information required will be promptly furnished by application, post paid, to John S Selby, Actuary. THOS. TREMBLE, Chairman of Exhibition Com. 40tf

PORTABLE FORGE AND BELLOWS—THE Subscriber, successor and sole manufacturer of Queen's Patent Portable Forge and Bellows, offers the same to the public as the best in use for blacksmiths, machinists, boiler makers, coppersmiths, shipping, railroads, mining, quarries, public works, &c, &c; also a superior jeweller's and dentist's forge, and which is frequently used in laboratories for chemical operations. These forges are constructed with slides for closing up or they can be placed in any possible position required for safety, and the entire escape of all smoke and gases to the chimney when used in-doors, also prevents any interference to the fire by wind or rain, when used outdoors or upon shipping Circulars containing full particulars and certificates will be forwarded upon application. FRED. P. FLAGLER, Wholesale and

A GOOD CHANCE FOR MANUFACTURING—A Water Privilege of ten feet fall, on a never-failing stream, with four acres of choice land, in the town of Cornwall, Orange Co, N. Y., 5 miles from the North River, and three miles from the railroad depot, and on the line of survey of the Albany and Hoboken RR. For particulars inquire of John J Vanduzer, 184 Canal st, N. Y., or John Orr, on the premises. 40 13*

NOTICE TO CONTRACTORS—Huntingdon and Broad Top Mountain Railroad. Proposals will be received at the office of the Engineer, in Huntingdon, Pa, until the 28th June, inst, for the Gradation and Masonry of 35 miles of the above Railroad. Plans and specifications will be exhibited in the office for three days previous to the letting.
40 2* S. W. MIFFLIN, Engineer.

UPTON'S GLUE—This celebrated brand is noted for its great strength and durability, having been proved by Chickering and Gilbert, the great piano makers of Boston, to be the only glue that will stand in all climates. For sale in barrels and cases by WM B. PARSONS, Sole Agent, 290 Pearl st, cor. Beekman, N. Y. 40 8*

EXCELSIOR SAND PAPER, GLUE—Premium "Excelsior" Sand and Emery Papers; these papers practical mechanics have decided to be the best the market affords; also "Abbott's" Manilla Sand, and Match Papers, Emery Cloth, Emery of the "Prospect Mills" brand, Corundrum, Pumice Stone ground and in lump, of very superior quality; also Glue of Upton's, Cooper's, and all other brands, in quantities to suit, at the manufacturers' lowest prices, for sale by WILLIAM B. PARSONS, 290 Pearl street, (corner Beekman) N. Y. 40 8*

NORRIS WORKS, Norristown, Pa The subscribers build and send to any part of the United States, Pumping, Hoisting, Stamping, and Portable Engines, and Mining Machinery of every description. THOMAS, CORSON & WEST. 40 1y.

MASCHER'S PATENT STEREOSCOPES—Illustrated in No. 37, Sci. Am, are manufactured and for sale wholesale or singly, as samples by the inventor, at 408 North Second street, Philadelphia; also for sale by the Scovill Manuf'g Co., 57 Maiden Lane; Meade & Brother, 233 Broadway, N. Y; Wesing, No. 2 N. Liberty st, Baltimore; Dobyns & Co. New Orleans, and Scammon & Co. Chicago, Ill. The prices are, for one-sixth size, $12, $15, and $30, and one-quarter size $15, $18, $26, $24, $33 and $36 per dozen, furnished with plate glass, and some with black, others with fine gilt borders, and preservers. 40 2*

GWYNNE'S CENTRIFUGAL PUMP—J. STUART GWYNNE—Dear Sir: We take great pleasure in recommending your Patent Centrifugal Pump; we put one into our Brewery in February last, which throws 60 gallons per minute, and do not hesitate on all accounts to recommend it as the best pump we possess any knowledge of. Yours, respectfully, Geo. W. SMITH & CO, Point Brewery, Pittsburg, May 16, 1853.

The above pump is our No. 2; stated number of gallons discharged per minute, 50; this throws 60, and in general they exceed our statements. Pumps of all sizes and capacities, manufactured and sold by the Union Power Co. of U. S. Office 49 Dey street, New York. 1*

NEW BRICK MACHINE—Now in successful operation in Baltimore, (see Sci. Am., Feb. last.) It is so simple that any intelligent negro can learn to manage it in two or three days. You have merely to shovel clay into a box, and attach a horse to the sweep. The machine tempers the clay and moulds the bricks in the most perfect manner, such as the most experienced hand can scarcely equal. When burned, they are found to be stronger and more solid than those made in the usual way, because the clay is worked stiffer under the pressure of the screw than it is possible to mould by hand. The clay is to be dug and left in soak all night. It then requires one man to shovel it in the box, a boy to put in the empty moulds, a third to wheel them to the floor, a fourth to discharge them, a fifth as supernumerary, to wait on the rest—in all, one man, a horse, and five boys, make from eight to ten thousand bricks per day. The gold medal was awarded for it by the Maryland Institute in November, 1852. Price of the four mould machine, $250—of the five mould, $300, including patent for machine. Address FRANCIS H. SMITH, Baltimore, Md., 39 2*

McALLISTER & BROTHER—Opticians and dealers in mathematical instruments, 48 Chesnut street, Phila. Mathematical instruments separate and in cases, Protractors, Spacing Dividers, Drawing Pens, Ivory Scales, Tape Measures, Salometers, Bourdon Steam Gauge, Spy Glasses, Microscopes, Hydrometers, &c., &c. An illustrated and priced catalogue will be sent by mail free of charge. 39 6m

CAUTION TO MANUFACTURERS of Wrought Iron direct from the Ore.—All persons are cautioned against infringing the patent of C. S. Quillard, granted Dec. 23rd, 1841, "for combining one or more reverberatory furnaces with a chimney or stack, containing in its lower part a deoxidizing vessel, in such manner that it and the contained ore and carbonaceous matter shall be heated by the flame and escape heat from the reverberatory furnace or furnaces." The undersigned are prepared to dispose of rights to use the same on liberal terms. Charles M Dupuy, Jr., Rondout, Ulster Co, N. Y.; C. V. Quilliard, 45 West 29th street, New York, assignees. 39 4*

KRUPP'S (London Council Medal 1851) CELEBRATED CAST STEEL—Of any dimensions, warranted superior to any other for Platers and other Rollers requiring hardening; also for hydraulic and other pistons, railway axles, and shafts for steam engines, &c. &c. This cast steel admits of welding without borax with the same facility as iron. THOS. PROSSER & SON, 28 Platt street, New York. 39tf

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SCIENTIFIC MUSEUM.

Rise and Fall of Lake Ontario.

A correspondent in the last number of "Hunt's Merchants Magazine," gives a very interesting account of phenomena connected with Lake Ontario. It has been long known that this lake is subject to frequent risings and fallings of the waters, and by many it has been supposed that such changes were regular. This, by long observation, has been found to be incorrect; the risings and fallings of the waters are not regular, but oftentimes sudden and produce wonderful effects. At Port Hope, Coborg, Graton, and Colbourne, the water recedes suddenly and leaves the harbor bare, and then returns with a violent roar and invades the land. This portion of Lake Ontario is subject to great submarine convulsions, and sometimes the waters ebb and flow every ten minutes. A convulsion of the Lake took place in September 1845, which gave birth to a terrific thunder storm, and was accompanied by a severe tornado. Another took place on the 5th July, 1850, which created a terrific water spout, which was broken by a bolt of electricity, that appeared to have come from the bottom of the Lake. Part of the water spout in a dark cloud passed over to the land depositing its waters at the heads of the Canada Creek, which raised the said Creek so suddenly as to carry away the railroad bridge of the Schenectady and Utica Railroad, before the trains could be informed of the event.

The waters of Lake Ontario have been known to fall fourteen inches in thirty-six hours, and these waters could not have been carried away in that short period by the river St. Lawrence. The Lake is underlaid with fossiliferous limestone, from the north shore in Canada, to the south shore, and it is not long since Watertown and Lowville were severely shaken by an earthquake; these places being built on the same limestone strata. This section of the Lake sometimes produces fearful lightning storms, one of which visited 1851, while there were three feet of snow on the ground. These facts seem to corroborate the views expressed on page 264, this Vol., Sci. Am., by Mr. Drummond, respecting some earthquakes which had taken place in North Britain.

"If some convulsion of nature were to take place so as to tumble down the falls of Niagara," says the author of the article referred to, "Lake Erie would become a river." Such a convulsion would need to open up a channel through the rock above the present falls a few miles long; some suppose that this was done once before, and that the Falls were down at Lewiston. There is a mystery connected with the rise and fall of the waters of Lake Ontario, which cannot be accounted for by continued rains or the melting of snows.

Enchanted Mountain in Texas.

They have strange things in Texas, as well as wicked doings. The following account of a great natural curiosity in that country is from the "Texas Telegraph:"—This singular mountain, or hill, is situated on the head waters of the Sallec—a small tributary of the Colorado, about eighty miles from Bastrop, in a northwesterly direction. It is about three hundred feet high, and appears to be an enormous oval rock, partially imbedded in the earth. When the sun shines the light is reflected from its polished surface as from an immense mirror, and the whole mountain glows with such a dazzling radiance that the beholder who views it, even from a distance of four or five miles, is unable to gaze upon it without experiencing a painful sensation, similar to that which is felt when looking upon the rising sun. The ascent of the hill is so very gradual, that persons can easily walk up to the top; but the rock is so smooth and slippery that those who make the attempt are compelled to wear the moccasins or stockings instead of shoes. This act, together with the name of the place, Holy Mountain, reminds the visitant very forcibly of the command made to Moses at Mount Horeb, "Put off they shoes from off they feet." The Camanches regard this hill with religious veneration, and Indian pilgrims frequently assemble from the remotest borders of the tribe to perform their Paynim rites upon its summit.

(For the Scientific American.)

Entomology.

[Continued from page 312.]

III. Hymenoptera—(Yoke-winged.)

Amethystina.

The members of this order, which embraces one-fourth of the insect population, are mandibulate, obtaining what little nourishment they need chiefly by lapping the nectar of flowers with a long tongue which passes through a proboscis like mouth. The anterior wings are larger than the posterior; and in flight the pairs unite by a series of hooks on the edges. The larvæ are very imperfect, and usually supported by the neutral part of the race. They are best developed in warm climates, where some species attain two inches in length and three by the wings. Their life never exceeds a year. Their instinct and locomotive powers are remarkable; and here we find contrivers that do not fall far short of intelligent beings. The last segment of the body in the females is prolonged into an organ, which in one division, *Aculeata*, is a sting connected with a poison reservoir; and in the *Tenebrantia*, an instrument for boring a place for their eggs. In the former, the abdomen is joined to the thorax by a slender peduncle; in the latter they are closely jointed. The former contains the group of Diggers, called Sand and Wood Wasps. They delight in the hottest sunshine, and burrow the sand by brushes or wood by strong mandibles. The ants form another family of this section. Though our species are harmless, some exotics rival the scorpion in sting and bite. In Guiana their hills are often 100 feet in circumference. Other [illegible] stories, each finished in 7 or 8 hours, containing saloons and galleries, with vaults supported by buttresses and pillars. The mason ants use clay; but the carpenters build with sawdust made into papier mache. As warriors, they exhibit true myrmidonian valor; rival cities like Rome and Carthage pour forth their myriads to decide the fate of their little world. As slave-dealers, they sally forth to pillage negro formicaries. As darymen, they pasture their milch kine—the Aphides—and milk them by patting the abdomen with their antennæ, which are their instruments of speech. As emigrants, colonies go forth to settle, the blacks carrying their masters, and forming roads by means of formic acid which they eject, as Hannibal cut the Alps. Their strength is wonderful; two or three will drag a young snake alive. The males and females are winged; the neuters tend the grubs. To one tribe medicine is indebted for a valuable styptic. Wasps have their wings folded when at rest. The cells in a vespiary sometimes number 16,000, peopled with 30,000. The females found the colonies; the males are the scavengers; and the workers control domestic affairs. A native of Cayenne builds its nest of a beautifully polished white pasteboard; but a greyish paper is generally used. The hornet (a dangerous insect) is of a larger genus, and its nest is often of the size of a half peck. Of the melliferous division, the clothier-bees envelope their nests with wool; the carpenter-group bore their cells out of solid wood; the masons build with artificial stone, and the upholsters line their domicils with boquets. The hive of the social bee is a miniature city, divided into streets composed of houses for magazines, habitations, and palaces, constructed on the most exact geometric principles, of a material which man cannot produce—mysteries which have puzzled philosophers from Aristomachus to Huber. The cells are hexagonal, with a pyramidal base formed of three rhomboid plates, whose angles are 109° 28′ and 70° 32′. A moderate swarm consists of 12,000, and is laid in two months, 5376 weigh a pound. In a populous hive, the thermometer ranges from 92° to 97°, and at swarming rises at 104°. Each individual makes about 4 excursions daily, and from 40 to 120 respirations per minute. The apartmentts are ventilated by rapidly vibrating their wings. Humming-bees (improperly called "Humble") live under-ground in societies of 50 or 60, and draw food chiefly from clover. Of the Sawing Hymenoptera, the family of Gall-flies are armed with teeth at the extremity, with which they enlarge slits on the oak or fig, and the tear issuing from the wound increases till it forms a covering for the eggs, in the shape of an excrescence. The nuts from Aleppo, containing more tannic acid, are of more value in the manufacture of ink; these are prickly and of a bluish green color. Some resemble beautiful fruits, and are eaten in the Levant. Others are hairy, some like mushrooms, artichokes, or flowers; and are of all sizes, from a pin's head to a walnut. The apples of the Dead Sea are the product of another species. The ovipositor of the saw-fly resembles a hand-saw, and its larvæ a caterpillar. Ichneumons feed on honey and deposit their eggs in the bodies of other insects. Over 3000 species are found in Europe alone. The Chalcids are of a brilliant metallic here, and generally leapers. The Chrysids or golden-tailed flies are often found running in the sunshine upon walls.

IV. Orthoptera—(Straight-winged.)

Mantis Religiosa.

This order includes all insects which masticate, and have two pairs of wings—one en[illegible] in their incomplete metamorphosis, and the softer covering of their bodies. They are carnivorous or omnivorous, terrestrial, and best developed in the torrid regions. In the family *Cursoria*, the legs are fitted for running. The earwig frequents dark and damp places, and does much injury to fruits and flowers. It sits upon its eggs with all the maternal instinct of a hen. The cockroach is a troublesome insect, infesting beds, pantries, clothes-chests, &c. It avoids the light, has an offensive smell, and small wings. The foreign insect (represented in the last figure) is sometimes called the walking-leaf, from the adaptation of its color to that of the leaves about it; but ottener, the praying mantis, from its common posture and soft modesty. It is, however, very cruel and voracious, having a long narrow body and powerful fore legs; they fight one another like infuriated hussars, and are the game-cocks of the Chinese. When alarmed they produce a noise like that of parchment rubbed together. The Phasma or walking-stick has a very long round body, which, when young, is usually green. The tribe *Saltatoria* are leapers, and deposit their eggs in the ground. Grasshoppers are herbivorous, have slender appendages, and do not swarm like locusts; their wing-covers, when closed, are roof-like, and their musical powers are such the Spaniards cage them. A hideous looking species from the south of Europe and Africa is devoid of wings. Of crickets, many burrow in the ground, most are nocturnal, and few can fly. The house-cricket is most noisy in the night, fiddling a shrill note by rubbing its wing-cases against each other. It flies like the woodpecker. The chirping of the field tribe is sharp and stridulous. Another species presents the structure and habit of the mole; it does great injury to roots, especially those of sugar-cane. Locusts chiefly inhabit Africa and the south of Asia: what are so called in America being cicadæ; they are generally of a brown color, about three inches in length, having a head liko a horse, two feelers about an inch long, dark eyes, strong jaws acting like scissors, a greenish corslet, and delicate wings, laying 40 oat-like eggs, and leaping 50 feet. An army of them is an inevitable fore-runner of famine; so immense sometimes as to reach 500 miles, so compact as to eclipse the sun, and the rushing of their wings is like the sound of a mighty cataract—being audible six miles. In the work of destruction they make a noise like flame driven by the wind, and the effect of their bite resembles that of fire. From their putrifying carcasses arises pestilential death, which, in Italy in 591, carried off a million of men and beasts. They are sold as eatables in the bazaar of Bagdad.

Languages of India.

A work on the Geographical Distribution of the principal language of India, and the feasibility of introducing English as a common language, by the Hon. Sir Erskine Perry, late President of the Supreme Court at Bombay, who has returned to England, after a sojourn in India, of twelve years, has been lately issued in London. He is a profound Orientalist and a European scholar, and has visited the various nations he describes; his views, moreover, are those of a statesman. India, through its whole extent, as now measured by geographers, contains in its computed population of a hundred and forty millions, at least as many languages and nationalities as Europe. According to Sir Erskine, there are two great classes, the northern and southern; the first consists of seven tongues and ten dialects; and the second of six languages without any dialects. The origin of each is curious and historically instructive. But the most remarkable portion of the essay, is the inquiry, whether the common medium of intercourse amongst the educated minds of India, cannot be accomplished—and the English be rendered that medium. The author argues in the affirmative, with full knowledge and confidence, and the time may yet arrive when the English will be the common language of all America, Australia, the Isles of the Pacific, and the whole East Indies.

Graduating Machine.

We have received three very neat small measure scales from Mortimer Hodge, of Westport, Mass., the divisions of which were laid out and executed by a machine invented by his father, Samuel Hodge, of Patterson, N. J. The machine will divide any given number of equal divisions in any given space, and make the lines of any degree of fineness.—The machine appears to be a good and ingenious one.

MECHANICS

Manufacturers and Inventors.

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